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Growth of a cold-water coral mound – coral framework accumulation versus the deposition of hemipelagic sediments

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Cold-water coral mounds have been discovered on many sites along the Atlantic continental margin within the last two decades. However, while the knowledge on the long-term development of these structures has been increasing continuously, we still can only speculate on the small-scale sedimentation dynamics that finally results in such mounds. To close this gap, a sediment core obtained from a low-latitude (17°40′N) cold-water coral mound in the Banda Mound Province off Mauritania was analysed. The coral record of this core is well dated by U/Th analyses on Lophelia pertusa. These analyses show three periods of coral growth in this core separated by hiatuses. One of these periods is preserved in a 135 cm long core section in which 8 coral U/Th-ages indicated that this growth phase lasted from 45-32 ka BP. In order to investigate how coral growth or coral accumulation relates to the filling of the coral framework with hemipelagic sediments 9 samples of mixed planktonic foraminifera were taken from this core section for radiocarbon dating. The foraminifera radiocarbon analyses revealed that matrix sedimentaton in the investigated sediment package entirely took place after the growth of corals ceased in a narrow time window of < 3000 yrs (32.5-29.8 cal ka BP). Grain size analyses showed a fining upward trend within the matrix of this sediment package (and similar others). The grain size analyses imply decreasing current speeds during the period of coral demise. This observation goes well along with previous studies proving currents to be essential for sufficient food supply for the suspension feeding corals. On the other hand the radiocarbon dates show that those reduced current speeds allowed the Thus, there might be a link between high current speed supporting coral growth and hampering the deposition of fine hemipelagic sediments on one hand and decreasing bottom currents no longer capable of supporting coral growth but allowing the deposition of fine material within the coral framework. Summarising, we state that in this case study mound growth took place in two phases, with first the accumulation of the coral fragments and afterwards the deposition of the matrix sediments and not simultaneously. Nonetheless, further studies are required to test if this pattern does also apply for other sites.